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NUCLEAR SCIENCE ABSTRACTS

Nuclear Science Abstracts is issued twice monthly throughout the calendar year by the Atomic Energy Commission. It is intended primarily to serve scientists and engineers working within the Atomic Energy Project by abstracting as completely and as promptly as possible the literature of nuclear science and engineering. It covers not only the unclassified and declassified research reports of the Atomic Energy Commission and its contractors, but also material in its field of interest which appears in technical and scientific journals and unpublished research reports of government agencies, universities, and industrial research establishments.

INDEXES

Volumes 1, 2, 3, and 4 of Nuclear Science Abstracts are cumulatively indexed by Author, Subject, and Nuclide in Volume 4, No. 24B, Dec. 30, 1950. The Author, Subject, and Nuclide indexes for Volume 5 of NSA appear in Volume 5, No. 24, Dec. 31, 1951. The cumulative Numerical Index of AEC Reports, described on the inside back cover, is published in Volume 5, No. 24, and includes all reports abstracted in the first five volumes of Nuclear Science Abstracts as well as those abstracted in Abstracts of Declassified Documents.

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AUTHOR INDEX

For each reference the digit preceding the dash is the volume number and digits after the dash are the abstract number.

SUBJECT INDEX

The number followed by a colon is the volume number, and the numbers following are the abstract numbers. The designation (R) following an abstract number indicates that it is the abstract of a progress report; the designation (J) indicates that it is an abstract of a journal (published literature) article; and the designation (P) indicates that it is an abstract of a patent. Abstract numbers for reports other than progress reports carry no letter designations.

NEW NUCLEAR DATA

Summary of New Nuclear Data on Half Lives, Radiations, Relative Isotopic Abundances, Nuclear Moments, Neutron Cross Sections, Reaction Energies, and Masses

Prepared by National Bureau of Standards Nuclear Data Group with the Assistance of Readers

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Readers: G. Friedlander and G. Scharff-Goldhaber, Brookhaven National Laboratory; P. Axel, University of Illinois; J. R. Stehn, Knolls Atomic Power Laboratory; L. Slack, Naval Research Laboratory; H. Pomerance, J. W. Cobble, F. K. McGowan, B. A. Soldano, and H. Zeldes, Oak Ridge National Laboratory; S. Frankel, University of Pennsylvania; W. E. Meyerhof, Stanford University.

In this issue, Nuclear Science Abstracts presents its second cumulation of new nuclear data. The material cumulated here is that which has appeared in NSA Vol. 6, Nos. 7 through 12A.

MAGNETIC MOMENT STANDARDS

In order to have a consistent basis for recording data on magnetic moments, results have been based on the following values and are without diamagnetic corrections.

$\mu(H^1) = 2.7934$ nuclear magnetons
This value has been adopted arbitrarily because it is the one used as a base in the Table of H. L. Poss, The Properties of Atomic Nuclei, I. Spins, Magnetic Moments and Electric Quadrupole Moments. (Revised, BNL-26 (T-10), (unclassified).) The values reported in the New Nuclear Data summaries are thus directly comparable with those listed in the survey of Poss.

$\nu(Na^{23})/\nu(H^1) = 0.26450$	E. Bleuler, M. Gabriel, Helv. Phys. Acta 20, 67(1947).
$\nu(D)/\nu(H^1) = 0.153506$	F. Bloch, E. C. Levinthal, M. E. Pachard, Phys. Rev. 72, 1125 (1947).
$\nu(B^{11})/\nu(H^1) = 0.320827$	D. A. Anderson, Phys. Rev. 76, 434 (1949).

LIST OF JOURNALS SURVEYED FOR NSA 6 NOS. 1 THROUGH 12

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Z. Naturforsch. 6a, Nos. 7-12.
Z. Physik 129, Nos. 1-6; 130, 1-5; 131, 1-4.

ABBREVIATIONS

a	absorption measurement
$a\beta\gamma$	absorption of β's in coincidence with γ's
ace^-	absorption of conversion electrons
a coin	measurement by placing absorbers between counters in coincidence
α	total γ-ray conversion coefficient, N_e/N_γ

$\alpha_K, \alpha_L, \ldots$	γ-ray conversion coefficient for electrons ejected from the K,L, ... shell
b	coefficient in angular correlation function, $1 + b\cos^2\theta$
B	band spectra method
Beγn	measurement by detection of photoneutrons from Be
cc	cloud chamber
ce^-	conversion electrons
chem	chemical separation of product following reaction
Cpt	Compton electrons
d	(1) deuteron, (2) descendant of, (3) days, when used as superscript
Dγn,Dγp	measurement by detection of photoneutrons or photoprotons from deuterium
EA	electrostatic analyzer
E_0	resonance energy
$E_\beta, E_\gamma, \ldots$	energy of β ray, energy of γ ray, ...
E1,E2, ...	electric dipole, electric quadrupole ...
f	fission, in abbreviations for methods of production or detection
F-K	Fermi-Kurie β energy distribution plot
Γ	resonance half-width (the whole width at half-maximum)
I	(1) spin in units of $h/2\pi$; (2) nuclear induction magnetic resonance method
ic	ionization chamber
K/L	α_K/α_L
M	molecular or atomic beam resonance method
M1,M2, ...	magnetic dipole, magnetic quadrupole ....
mb	millibarns
Mic	microwave method
mir	measurement by total reflection of neutron beam from mirror surface
ms	mass spectrometer
μ	(1) magnetic moment in units of nuclear magnetons, (2) micron, 10^{-4} cm
μs	microseconds
osc	pile oscillator method
para	paramagnetic resonance method
pc	proportional counter
pe^-	photo electrons
ppl	photoplates or emulsions
q	electric quadrupole moment in units of barns
Q	reaction energy in Mev
s	(1) spectrometer method, (2) seconds, when used as superscript
S	atomic-spectra measurement
scin	scintillation counter
sl	lens spectrometer
sl;ce^-	conversion electrons measured in lens spectrometer
st	strong
sπ	180° spectrometer
s$\pi\sqrt{2}$	double focusing spectrometer
σ	cross section in barns
σ_0	cross section at resonance energy, E_0
σ_a	absorption cross section
σ_{el}	elastic scattering cross section
σ_{in}	inelastic scattering cross section
σ_s	scattering cross section
σ_t	total cross section
t	triton, H^3
th	thermal
w, vw	weak, very weak
τ	half life in units indicated
$\beta\gamma,\gamma\gamma$	$\beta\gamma$ or $\gamma\gamma$ coincidences
$\beta\gamma(\theta)$	angular correlation of β's and γ's in coincidence
d,p(θ)	angular distribution of protons with respect to deuteron beam

Standard journal abbreviations are used.
All energies are given in Mev and all cross sections in barns unless otherwise stated in the tabular material.

NEW NUCLEAR DATA

${}_0n_4^4$	Not found from Rh or Bi (18 Mev n)	K.-H. Sun et al., Phys. Rev. 85, 942 (1952).
H	σ_t(10.0 ev) (lucite) 20.09 (polystyrene) 20.49	C. T. Hibdon, ANL-4602 (March 1951).
	σ_t(14.1 Mev) 0.689	H. L. Poss et al., Phys. Rev. 85, 703A(1952).
${}_1H_2^3$	Spectral shape analyzed neutrino mass <5 kev	O. Kofoed-Hansen, Phil. Mag. 42, 1448 (1951).
He	σ_s(th n) 0.78	C. T. Hibdon, C. O. Muehlhause, ANL-4680 (Sept. 1951).
${}_3Li_3^6$	Level 2.12 Li^6(p,p) sπ	W. M. Harris, Phys. Rev. 84, 1249(1951).
${}_3Li_4^7$	μ 3.2569 I	T. Kanda et al., Phys. Rev. 85, 938(1952).
${}_3Li_4^7$	Level 4.59 Be^9(d,α)	A. Ashmore, J. F. Raffle, Proc. Phys. Soc. (London) A65, 296(1952).
	Li^6(d,pγ)Li^7 p$\gamma(\theta)$ = constant $E_d = 0.5$	W. H. Burke, J. R. Risser, Phys. Rev. 85, 741A(1952).
	Li^6(d,pγ)Li^7 p$\gamma(\theta)$ = constant $E_d = 1.0$	G. C. Phillips et al., Phys. Rev. 85, 742A(1952).
	$\dfrac{\sigma[B^{10}(n,\alpha)Li^7]}{\sigma[B^{10}(n,\alpha)0.477\text{ level }Li^7]}$ graph for $E_n = 0 - 4$	H. Bichsel et al., Helv. Phys. Acta 25, 119(1952).
Be	σ_t(1.9 − 3.8 Mev) graph Broad maximum at 2.75	R. Ricamo, W. Zünti, Helv. Phys. Acta 24, 419(1951).

Nucleus	Data	Method	Reference
$_4Be_3^7$	Levels / Γ / J ~6.4 / large / $\leq 3/2+$ 7.16 / 0.43 / $5/2-$	Li^6(p,p and p,α)	S. Bashkin, H. T. Richards, Phys. Rev. 84, 1124(1951).
	Level 0.432 No other γ with $E_\gamma<1.0$	$B^{10}(p,\alpha\gamma)$ scin	R. B. Day, T. Huus, Phys. Rev. 85, 761A (1952).
	No $\gamma\gamma$	scin	F. R. Metzger, Phys. Rev. 85, 727A(1952).
$_4Be_4^8$	Levels 22.58, 23.68	$Li^6(d,n)Be^7$ pc	L. M. Baggett, S. J. Bame, Jr., Phys. Rev. 85, 741A(1952).
	Resonant γ's isotropic, non-resonant anisotropic	$Li^7(p,\gamma)$	H. Nabholz et al., Helv. Phys. Acta 25, 153(1952).
	Resonances: 1.05, 1.88, 2.06	Li^7(p,p)	S. Bashkin, H. T. Richards, Phys. Rev. 84, 1124(1951).
	Resonance Level / E_0 / Γ ~21.5 / ~4.9 / ~0.4	$Li^7(p,n)Be^7$	J. K. Bair et al., Phys. Rev. 85, 946 (1952).
	Resonances: 2.2, 4.5	Li(p,n)54^{d}Be	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
	Level (broad) ~5.8?	$B^{10}(\gamma,d)Be^8 \rightarrow 2\alpha$ ppl	M. J. Brinkworth, E. W. Titterton, Phil. Mag. 42, 952(1951).
$_4Be_5^9$	Li^8 identified $E_t = 0.35$	$Li^6(t,p)Li^8$	C. D. Moak et al., Phys. Rev. 85, 928 (1952).
	Levels 17.22, 17.45, 17.80, 18.3	$Li^7(d,n)Be^8$ $Li^7(d,p)Li^8$ pc	L. M. Baggett, S. J. Bame, Jr., Phys. Rev. 85, 741A(1952).
	Level 2.57	Be^9(p,p) a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
$_4Be_6^{10}$	p(θ) I(0.0 and 3.37 levels) = 0, 1, 2, or 3 (+)	Be^9(d,p)	F. A. El-Bedewi, Proc. Phys. Soc. (London) A65, 64(1952).
$_5B_4^9$	τ $>3\times10^{-19s}$ n spread	Be^9(p,n)	P. H. Stelson, W. M. Preston, Phys. Rev. 83, 469(1951).
	No levels for $E_p = 2-5.3$	Be(p,n)	T. M. Hahn et al., Phys. Rev. 85, 934 (1952).
$_5B_5^{10}$	Resonances E_0 / Γ 2.57 4.72 / ~0.5	$Be^9(p,n)B^9$ $Be^9(p,\gamma)B^{10}$	T. M. Hahn et al., Phys. Rev. 85, 934 (1952).
	Level 0.718	B(p,pγ) scin	R. B. Day, T. Huus, Phys. Rev. 85, 761A (1952).
$_5B_5^{10}$	Level 2.34	B^{10}(p,p) a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
$_5B_6^{11}$	γ's 4.5, 6.7, 9.0	B^{10}(d,p) pair s	J. Terrell, G. C. Phillips, Phys. Rev. 83, 703(1951).
	p$\gamma(\theta)$ = constant	$B^{10}(d,p\gamma)B^{11}$ $E_d = 1.8$	G. C. Phillips et al., Phys. Rev. 85, 742A(1952).
	Level 2.06	B^{11}(p,p) a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
C	σ_t(1.9 – 3.8 Mev) E_0 / σ_0 / Γ 2.09 / 2.4 / ~0.04 2.95 / 2.6 / ~0.14	graph	R. Ricamo, W. Zünti, Helv. Phys. Acta 24, 419(1951).
	σ_t(14.1 Mev) 1.279		H. L. Poss et al., Phys. Rev. 85, 703A(1952).
$_6C_5^{11}$	Resonance 1.52	$B^{10}(p,\alpha\gamma)$	R. B. Day, T. Huus, Phys. Rev. 85, 761A (1952).
$_6C_6^{12}$	Level γ 4.45	Be(α,n) scin	S. A. E. Johansson, Phil. Mag. 43, 249 (1952).
	Resonances E_0 / Γ / E_γ 0.162 / / 4.45, 11.6 0.67 / 0.31 / 4.44, 12.0, 16.4 1.37 / 1.15 / 4.45, 12.7, 16.9	B(p,γ) scin	T. Huus, R. B. Day, Phys. Rev. 85, 761A(1952).
	Resonances: 3.7, 5.2, 5.9, 6.4	B^{11}(p,n)20.4^{m}C	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
	γ 4.5	B^{11}(d,n) pair s	J. Terrell, G. C. Phillips, Phys. Rev. 83, 703(1951).
	Be^8 intermediate?	$C^{12}(\gamma,3\alpha)$	R. Chastel, Compt. rend. 233, 1440(1951).
	Level 4.20	C^{12}(p,p) a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
	$\alpha(\theta)$ for 0 and 4.4 levels	$N^{14}(d,\alpha)$	W. M. Gibson, E. E. Thomas, Proc. Roy. Soc. (London) 210A, 543(1952).
$_6C_7^{13}$	n(θ) Level / J 8.20 / $d_{3/2}$	C^{12}(n,n)	R. Ricamo, Nuovo cimento 8, 893(1951).
	σ_s coh 4.5 (+) σ_s bound 5.5		W. C. Koehler, E. O. Wollan, Phys. Rev. 85, 491(1952).

$_{6}C_{9}^{15}$	γ ~5.5 a coin	E. L. Hudspeth, W. B. Rose, Phys. Rev. 85, 742A(1952). C^{14}(1.8 Mev d,p).
$_{7}N_{7}^{14}$	Resonance $C^{12}(d,n)N^{13}$ E_0 Γ(kev) 1.435 ~6	K. Famularo et al., Phys. Rev. 85, 742A (1952).
	$C^{13}(p,\gamma)$ Levels Γ(kev) 8.05 32.5 8.62 6 8.70 500 9.18 2.1 9.49 45	J. D. Seagrave, Phys. Rev. 85, 197(1952).
	$C^{13}(p,n)10.1^{m}N$ Resonances: 4.0, 5.0, 6.2	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
	Levels N(p,p) 2.35, 3.95 a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
	$d(\theta)$ N(d,d)	W. M. Gibson, E. E. Thomas, Proc. Roy. Soc. (London) 210A, 543(1952).
	σ(2 Mev n,p) = 0.07 (3.6 Mev n,p) = 0.15 σ(2 Mev n,α) = 0.01 (3.6 Mev n,α) = 0.02	W. Bollmann, W. Zünti, Helv. Phys. Acta 24, 517(1951).
$_{7}N_{8}^{15}$	Resonances $N^{14}(n,\alpha)B^{11}$ 2.26, 2.56, 2.75 $N^{14}(n,p)C^{14}$ 2.26, 2.80	W. Bollmann, W. Zünti, Helv. Phys. Acta 24, 517(1951).
	$p(\theta)$ ppl N(d,p) Level I ground ½–, 3/2–, 5/2– 6.33 3/2–, 5/2– ? 8.32 ½+, 3/2+ 9.22 ½+, 3/2+	W. M. Gibson, E. E. Thomas, Proc. Roy. Soc. (London) 210A, 543(1952). E_d = 7.89.
	γ's $N^{14}(d,p)$ 4.4, 5.3, 6.4, 7.4, 8.5 pair s	J. Terrell, G. C. Phillips, Phys. Rev. 83, 703(1951).
O	σ_t(1.9 – 3.8 Mev) graph E_0 1.9, 3.75 Marked dip at 2.37	R. Ricamo, W. Zünti, Helv. Phys. Acta 24, 419(1951).
$_{8}O_{7}^{15}$	Capture γ's N(p,γ) 0.75 5.29 1.39 6.21 2.38 6.84 scin	C. H. Johnson et al., Phys. Rev. 85, 931 (1952); 85, 727A (1952).
$_{8}O_{9}^{17}$	$\sigma_s(\theta)$ $O^{16}(n,n)$ Level Γ J 5.94 $p_{1/2}$ 6.36 0.18 $s_{1/2}$ 7.28 0.22 $d_{3/2}$ 7.73 0.80 $p_{3/2}$ 8.29 0.28 $p_{1/2}$	E. Baldinger et al., Phys. Rev. 84, 1058 (1951); Helv. Phys. Acta 25, 142(1952).
	$p(\theta)$ ppl O(d,p) Level I ground 5/2+, 3/2+ 0.88 ½+	E. J. Burge et al., Proc. Roy. Soc. (London) 210A, 534 (1952). E_d = 7.73.
$_{8}O_{9}^{17}$	$O^{16}(d,p\gamma)O^{17}$ $p\gamma(\theta)$ = constant E_d = 1.7, 2.0	G. C. Phillips et al., Phys. Rev. 85, 742A(1952).
$_{9}F_{10}^{19}$	$O^{18}(p,n)1.87^{h}F$ Resonances: 3.3, 3.8, 4.25, 5.1, 5.6, 6.2, 6.7	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
	Levels F(p,p) 1.53, 3.83 a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
	σ_s(th n) 3.75	C. T. Hibdon, C. O. Muehlhause, ANL-4680 (Sept. 1951).
Ne	Levels Ne(p,p) 1.44, 4.36 a	N. P. Heydenburg et al., Phys. Rev. Rev. 85, 742A (1952).
$_{10}Ne_{9}^{19}$	τ 18.6^{s}	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951). F(p,n).
$_{10}Ne_{10}^{20}$	Resonances $\left\{ \begin{array}{l} F^{19}(p,\alpha\gamma)O^{16} \\ F^{19}(p,n)Ne^{19} \end{array} \right.$ E_p = 0.2 – 5.4	H. B. Willard et al., Phys. Rev. 85, 849 (1952).
	$F^{19}(p,n)18^{s}Ne$ Resonances: 4.8, 5.4, 5.8, 6.1, 6.5	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
	No n thresholds $F^{19}(d,n)$ for E_d = 0.5 – 2	J. W. Butler, Phys. Rev. 85, 743A(1952).
	γ's $F^{19}(d,n)$ 8.1, 9.3, 11.5 pair s	J. Terrell, G. C. Phillips, Phys. Rev. 83, 703(1951).
Na	σ_t(2 – 80 kev) graph E_0 2.8, 5.5 kev	C. T. Hibdon et al., Phys. Rev. 85, 595 (1952).
$_{11}Na_{12}^{23}$	μ 2.2167 I	T. Kanda et al., Phys. Rev. 85, 938(1952).
	Level Na(d,p) 3.67 a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
$_{12}Mg_{12}^{24}$	$Na^{23}(p,n)11.9^{m}Mg$ Resonances: 5.3, 5.6, 6.0, 6.2, 6.4	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
	$(1.4\gamma)p(\theta)$ $Mg^{24}(p,p\gamma)$	H. E. Gove, A. Hedgran, Phys. Rev. 85, 727A (1952).
	σ_a(th n) 0.033 osc	H. Pomerance, T. Arnette, ORNL-940 (1950); priv. comm. (1952).
$_{12}Mg_{13}^{25}$	New levels $Al^{27}(d,\alpha)$ 3.96, 4.12, 6.98, 7.85, 8.62, 9.06, 9.75, 10.78, 11.89 ppl	E. C. Toops et al., Phys. Rev. 85, 280 (1952).

${}_{12}Mg^{25}_{13}$	σ_a(th n) 0.27	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{12}Mg^{26}_{14}$	σ_a(th n) 0.06	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{13}Al^{24}_{11}$	τ 2.3^s Mg(p,n) Delayed α emitter $E_p = 15.4$		A. C. Birge, Phys. Rev. 85, 753A(1952).
${}_{13}Al^{26}_{13}$	τ 6.5^s		L. Katz, A. G. W. Cameron, Phys. Rev. 84, 1115(1951).
${}_{13}Al^{26?}_{13}$	Mg(p,n)7.3^{s}Al Resonances: 5.5, 5.8, 6.0, 6.3, 6.5		J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
${}_{13}Al^{27}_{14}$	μ 3.6395	I	T. Kanda et al., Phys. Rev. 85, 938(1952).
	Levels Al(p,p) 1.02, 2.30, 2.89, 3.32, 4.48	a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
	Levels Al(p,p) 22 tentative values		E. M. Reilley et al., Phys. Rev. 85, 704A(1952).
${}_{14}Si^{28}_{14}$	Al^{27}(p,n)4.9^{s}Si Resonances: 6.2, 6.4		J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
	σ_a(th n) 0.08	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{14}Si^{29}_{15}$	σ_a(th n) 0.27	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{14}Si^{30}_{16}$	γ's Al^{27}(α,p) γ_1 2.32 γ_2 3.6 γ_3 1.28 γ_4 ~2.7 Coincidences $p_1\gamma_1$, $p_2\gamma_2$, $p_3\gamma_2$, $p_3\gamma_3$, $p_3\gamma_4$		R. C. Allen et al., Phys. Rev. 84, 1203 (1951).
	σ_a(th n) 0.41	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{14}Si^{31}_{17}$	τ 2.65 ± 0.01^h β^- 1.471	sl	H. T. Motz, Phys. Rev. 85, 501(1952). P^{31}(pile n,p); chem.
${}_{15}P^{30}_{15}$	Levels Si^{29}(d,n) 0.75, 1.46, 2.00	ppl	C. E. Mandeville et al., Phys. Rev. 85, 193(1952); 85, 725A (1952).
${}_{15}P^{31}_{16}$	μ 1.1308	I	T. Kanda et al., Phys. Rev. 85, 938(1952).
	Levels Si^{30}(d,n) 0.33, 1.19, 2.22, 3.41	ppl	C. E. Mandeville et al., Phys. Rev. 85, 193(1952); 85, 725A (1952).
${}_{15}P^{31}_{16}$	σ_s(th n) 4.67		C. T. Hibdon, C. O. Muehlhause, ANL-4680 (Sept. 1951).
${}_{15}P^{32}_{17}$	β^- 1.697	sl	H. T. Motz, Phys. Rev. 85, 501(1952).
	β^- 1.704 Bump at $H\rho \sim 1000$ not found by S(d) or P(n)	sl	E. N. Jensen et al., Phys. Rev. 85, 112 (1952).
${}_{15}P^{33}_{18}$	τ 24.8^d β^- 0.26	sl	E. N. Jensen et al., Phys. Rev. 85, 112 (1952). S(n,p); S(γ,p).
S	Variation in terrestrial S^{32}/S^{34} ratio Same ratio for igneous and meteoritic samples		J. Macnamara et al., Can. J. Chem. 30, 73(1952).
${}_{17}Cl^{35}_{18}$	μ 0.82110	I	H. E. Walchli et al., Phys. Rev. 85, 922 (1952).
	q coupling ratio TlCl^{35}/TlCl^{37} 1.2691 ± 0.0004	M	R. O. Carlson et al., Phys. Rev. 85, 784 (1952).
	1.270 ± 0.005	M	H. J. Zeiger, D. I. Bolef, Phys. Rev. 85, 788(1952).
${}_{17}Cl^{36}_{19}$	I 2 q −0.0164	Mic Mic	D. A. Gilbert, Phys. Rev. 85, 716A(1952).
${}_{18}A^{36}_{18}$	$A^{40}/A^{36} \left\{\begin{matrix}\text{inner earth}\\ \text{atmospheric}\end{matrix}\right\} > 1$		G. Boato, Nuovo cimento 9, 44(1952).
${}_{18}A^{38}_{20}$	Resonances Cl^{37}(p,n)A^{37} over 100 found for $E_p = 1.64 - 2.51$		W. A. Schoenfeld et al., Phys. Rev. 85, 873(1952).
	Cl(p,n)34^{d}A Excitation function		J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
${}_{18}A^{41}_{23}$	$\beta\gamma$ delay 6.7×10^{-9s}	scin	L. G. Elliott, Phys. Rev. 85, 942(1952).
	p(θ) ppl A(d,p) Level — I ground — 5/2−, 7/2− 1.34 — 1/2+ ?		W. M. Gibson, E. E. Thomas, Proc. Roy. Soc. (London) 210A, 543(1952). $E_d = 7.81$.
${}_{19}K^{40}_{21}$	$g_I(K^{40})/g_I(K^{39})$ −1.2434 ± 0.0003	M	J. T. Eisinger, B. Bederson, Phys. Rev. 85, 716A(1952).
	σ_a(th n) 75	osc	H. Pomerance, priv. comm. (1952).
${}_{20}Ca^{40}_{20}$	σ_a(th n) ≤0.22 Ca^{43} contribution unknown	osc	H. Pomerance, priv. comm. (1952).
${}_{20}Ca^{41}_{21}$	τ $1.2 \times 10^{5y*}$ K x ray	pc	F. Brown et al., Phys. Rev. 84, 1243(1951). *Based on $\sigma[Ca^{40}(n,\gamma)Ca^{41}] = 0.35$ and K fluorescence yield = 0.1.
${}_{20}Ca^{42}_{22}$	σ_a(th n) 40	osc	H. Pomerance, priv. comm. (1952).

Nuclide	Property / Value	Method	Reference
$_{20}Ca^{48}_{28}$	τ $>2 \times 10^{16y}$		J. W. Jones, T. P. Kohman, Phys. Rev. 85, 941(1952).
Ti	σ_s(th n) 3.96		C. T. Hibdon, C. O. Muehlhause, ANL-4680 (Sept. 1951).
	σ_t(3000 ev) 5.02		C. T. Hibdon, ANL-4602 (Mar. 1951).
	σ_t(2 – 40 kev) graph E_0 19, 23 kev		C. T. Hibdon et al., Phys. Rev. 85, 595 (1952).
$_{22}Ti^{46}_{24}$	σ_a(th n) 0.57	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{22}Ti^{47}_{25}$	σ_a(th n) 1.62	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{22}Ti^{48}_{26}$	σ_a(th n) 7.98	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{22}Ti^{49}_{27}$	σ_a(th n) 1.80	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{22}Ti^{49?}_{27}$	I 7/2? μ −1.1024	I I	C. D. Jeffries et al., Phys. Rev. 85, 478 (1952).
$_{22}Ti^{50}_{28}$	σ_a(th n) 0 ± 0.2	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
V	σ_t(2 – 25 kev) graph E_0 7, 13, 17, 23? kev		C. T. Hibdon et al., Phys. Rev. 85, 595 (1952).
$_{23}V^{50}_{27}$	g_I +0.55704	I	H. E. Walchli et al., Phys. Rev. 85, 922 (1952).
$_{24}Cr^{53}_{29}$	I 3/2 μ ~(±)0.45	para	B. Bleaney, K. D. Bowers, Proc. Phys. Soc. (London) A64, 1135(1951).
Mn	σ_t(2 – 80 kev) graph E_0 2.8, 8, 23, 38 kev (60, 67, 78) ?		C. T. Hibdon et al., Phys. Rev. 85, 595 (1952).
$_{25}Mn^{53}_{28}$	Level 0.40	Cr^{53}(p,n)	P. H. Stelson, W. M. Preston, Phys. Rev. 83, 469(1951).
Fe	σ_t (77 – 800°K) graphs E_n ~0.002 ev		R. Latham, J. M. Cassels, Proc. Phys. Soc. (London) A65, 241(1952).
	σ_t(3000 ev) 7.00		C. T. Hibdon, ANL-4602 (Mar. 1951).
	σ_t(2 – 24 kev) graph E_0 8.5, 16? kev		C. T. Hibdon et al., Phys. Rev. 85, 595 (1952).
$_{26}Fe^{54}_{28}$	σ_a(th n) 2.18	osc	H. Pomerance, priv. comm. (1952).
$_{26}Fe^{56}_{30}$	σ_a(th n) 2.55	osc	H. Pomerance, priv. comm. (1952).
$_{26}Fe^{57}_{31}$	σ_a(th n) 2.36	osc	H. Pomerance, priv. comm. (1952).
$_{26}Fe^{58}_{32}$	σ_a(th n) 2.5	osc	H. Pomerance, priv. comm. (1952).
$_{26}Fe^{59}_{33}$	γ 2.5% 0.195 (0.195γ)(1.0γ)	scin	F. R. Metzger, Phys. Rev. 85, 727A(1952).
Co	σ_s(th n) 8.34 σ_t(10.0 ev) 10.29 (19.5 ev) 8.52 (2700 ev) 4.09 (3000 ev) 4.55		C. T. Hibdon, ANL-4602 (Mar. 1951).
	σ_t(2 – 100 kev) graph E_0 5.5, 8?, 29.5 kev		C. T. Hibdon et al., Phys. Rev. 85, 595 (1952).
$_{27}Co^{60}_{33}$ 5.2^y	μ 3.0	$\gamma(\theta,T)$	B. Bleaney et al., Phys. Rev. 85, 688 (1952).
	3.2	$\gamma(\theta,T)$	C. J. Gorber et al., Physica 18, 135 (1952).
	$\gamma\gamma(\theta)$ 1.1γ, 1.3γ ≥octupole		S. Das, S. K. Sen, Indian J. Phys. 25, 451(1951).
Ni	σ_t(2 – 41 kev) graph E_0 4.5, 17, 30? kev		C. T. Hibdon et al., Phys. Rev. 85, 595 (1952).
	Level 1.44	Ni(p,p) a	N. P. Heydenburg et al., Phys. Rev. 85, 742A (1952).
	13 levels unassigned to isotope	Ni(p,p)	R. Ely, Jr., et al., Phys. Rev. 85, 704A(1952).
$_{28}Ni^{60}_{32}$	Levels 1.338, 1.475, 2.497	Ni(p,p)	R. Ely, Jr., et al., Phys. Rev. 85, 704A(1952).
$_{30}Zn^{67}_{37}$	I 5/2 μ +0.87376 ±0.00013	I	S. S. Dharmatti, H. E. Weaver, Jr., Phys. Rev. 85, 927(1952).
Ge	σ_t(10.0 ev) 5.13 (19.5 ev) 4.08 (120 ev) 4.93 (345 + 2400 ev) 4.01 (2700 ev) 2.54 (3800 ev) 4.47		C. T. Hibdon, ANL-4602(Mar. 1951).
$_{32}Ge^{70}_{38}$	σ_a(th n) 3.3	osc	H. Pomerance, ORNL-577(1949); Phys. Rev. 78, 814(1950).
$_{32}Ge^{72}_{40}$	σ_a(th n) 0.94	osc	H. Pomerance, ORNL-577(1949); Phys. Rev. 78, 814(1950).
$_{32}Ge^{73}_{41}$	σ_a(th n) 13.7	osc	H. Pomerance, ORNL-577(1949); Phys. Rev. 78, 814(1950).

${}_{32}Ge^{74}_{42}$	σ_a(th n)	0.60	osc	H. Pomerance, ORNL-577(1949); Phys. Rev. 78, 814(1950).
${}_{32}Ge^{76}_{44}$	σ_a(th n)	0.35	osc	H. Pomerance, ORNL-577(1949); Phys. Rev. 78, 814(1950).
${}_{32}Ge^{77}_{45}$ 59^s	γ	0.380	scin	A. C. G. Mitchell, A. B. Smith, Phys. Rev. 85, 153(1952). Ge(slow n).
12^h	β^- γ	2.2 complex 0.263	s s	A. C. G. Mitchell, A. B. Smith, Phys. Rev. 85, 153(1952).
As	σ_t(2700 ev) (3000 ev)	7.35 6.77		C. T. Hibdon, ANL-4602 (Mar. 1951).
${}_{33}As^{71}_{38}$	τ	~50^h		D. F. Bracher, A. R. Crathorn, Nature 169, 364(1952). Ge(d,n); ms.
${}_{33}As^{75}_{42}$	I μ	3/2 +1.4354	I I	C. D. Jeffries et al., Phys. Rev. 85, 478(1952).
${}_{33}As^{76}_{43}$	γ 1.0* 0.095* 0.25* 0.016* 0.055*	0.555 0.648 1.21 1.41 2.06	sl; pe$^-$, Cpt	P. Hubert, J. phys. radium 12, 823 (1951). *Relative intensity.
${}_{33}As^{79}_{46}$	β^- No γ	~2.1	a	P. J. Van der Haack et al., Physica 18, 20(1952). Se(n), Se(d); chem.
${}_{34}Se^{74}_{40}$	σ_a(th n)	44	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{34}Se^{76}_{42}$	σ_a(th n)	82	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{34}Se^{77}_{43}$	I	½	B	S. P. Davis, F.A. Jenkins, Phys. Rev. 83, 1269(1951).
	σ_a(th n)	40	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
${}_{34}Se^{78}_{44}$	I	0	B	S. P. Davis, F. A. Jenkins, Phys. Rev. 83, 1269(1951).
${}_{34}Se^{79}_{45}$ 6.5×10^{4y}	I q	7/2 1.2	Mic	W. A. Hardy et al., Phys. Rev. 85, 494(1952). Fission; chem.
${}_{37}Rb^{85}_{48}$	μ	1.3486	I	H. E. Walchli et al., Phys. Rev. 85, 922 (1952).
	$\Delta\nu(Rb^{87})/\Delta\nu(Rb^{85})$	$= 2.251413 \pm 0.000005$	M	S. A. Ochs, P. Kusch, Phys. Rev. 85, 145 (1952).

${}_{37}Rb^{86}_{49}$	$\beta\gamma(\theta)$	b = +0.13		D. T. Stevenson, M. Deutsch, Phys. Rev. 83, 1202(1951).
${}_{38}Sr^{85}_{47}$ 70^m	K 14% γ 84.7% 84.7% 1.3% (0.150γ)X No (0.233γ)X	 0.0075 α = large 0.150 0.225 α~0.026, K/L~5 0.233	 E3 MI M4 (Rb)	A. W. Sunyar et al., Phys. Rev. 85, 734A(1952); priv. comm. Sr^{84}(pile n).
${}_{38}Sr^{85}_{47}$ 65^d	γ No e$^-$ with 0.12 < E < 0.2 X/γ ~1	0.514 α_K = 0.007, K/L ~12 $\tau > 1^{\mu s}$	s;ce$^-$,pe$^-$	W. S. Emmerich, J. D. Kurbatov, Phys. Rev. 85, 149 (1952); 85, 733A (1952).
	K γ 100%	 0.513 α = 0.008 $\tau = 0.9^{\mu s}$	 scin M2	A. W. Sunyar et al., Phys. Rev. 85, 734A(1952); priv. comm. Rb(d); chem.
Zr	σ_t(19.5 ev) (120 ev) (345 + 2400 ev) (2700 ev) (3000 ev)	6.23 6.30 5.83 6.03 6.23		C. T. Hibdon, ANL-4602 (Mar. 1951).
${}_{41}Nb^{91}_{50}$ 64^d	τ γ	62^d 0.105 K/L + M = 2.1		P. Preiswerk, P. Stähelin, Helv. Phys. Acta 24, 300 (1951).
${}_{41}Nb^{92}_{51}$	K >99.95% β ≤0.05% γ >99.95%	 0.930		P. Preiswerk, P. Stähelin, Helv. Phys. Acta 24, 300 (1951).
${}_{41}Nb^{94}_{53}$	τ_2	>5 $\times 10^{4y}$		R. E. Hein et al., Phys. Rev. 85, 138 (1952).
${}_{41}Nb^{95}_{54}$ 90^h	τ γ	80^h 0.232 K/L + M = 3.5	 sl;pe$^-$	P. Preiswerk, P. Stähelin, Helv. Phys. Acta 24, 300 (1951).
${}_{41}Nb^{96}_{55}$	τ β^- 8% 92% γ	23^h 0.370 0.750	 sl sl;ce$^-$	P. Preiswerk, P. Stähelin, Helv. Phys. Acta 24, 300 (1951).

I(%)	Eγ	$\alpha \times 10^4$
7	0.216	<230
10	0.238	<160
27	0.451	40
61	0.560	16
5	0.725?	?
100	0.770	12
6	0.804	13
16	0.840	12
52	1.078	5.6
32	1.187	3.1

$_{42}Mo^{93}_{51}$	$(0.24e^-)\gamma(\theta)$ b = +0.33 $\gamma\gamma(\theta)$ b = +0.20	D. T. Stevenson, M. Deutsch, Phys. Rev. 83, 1202(1951).
$_{42}Mo^{96}_{54}$	σ_a(th n) 1.2 osc	H. Pomerance, priv. comm. (1952).
$_{42}Mo^{97}_{55}$	σ_a(th n) 2.1 osc	H. Pomerance, priv. comm. (1952).
$_{42}Mo^{98}_{56}$	σ_a(th n) 0.38 osc	H. Pomerance, priv. comm. (1952).
$_{42}Mo^{100}_{58}$	σ_a(th n) 0.5 osc	H. Pomerance, priv. comm. (1952).
	σ(th n,γ)14.6^mMo 0.23	V. Hummel, ANL-4659 (June 1951).
$_{43}Tc^{94}_{51}$	51.5^m activity now assigned to Tc^{96}, q.v.	H. A. Medicus, H. T. Easterday, Phys. Rev. 85, 735A(1952).
$_{43}Tc^{96}_{53}$	τ_1 51.5^m Formerly assigned to Tc^{94}	H. A. Medicus, H. T. Easterday, Phys. Rev. 85, 735A(1952). Mo^{96}(4-Mev p,n).
	Γ(0.8 level) $\lesssim$ 0.02 ev scin τ(0.8 level) $\gtrsim 0.5\times10^{-13s}$	F. R. Metzger, Phys. Rev. 83, 842(1951).
$_{43}Tc^{99}_{56}$	μ +5.6586 I	H. Walchli et al., Phys. Rev. 85, 479(1952).
5.9^h	τ dependent on chemical state	K. T. Bainbridge et al., Phys. Rev. 84, 1260(1951).
$_{45}Rh^{103}_{58}$	I ½ S μ ~-0.1 S	H. Kuhn, G. K. Woodgate, Proc. Phys. Soc. (London) A64, 1090(1951).
$_{45}Rh^{106}_{61}$	β^- 3% 2.0 sl 12% 2.44 11% 3.1 68% 3.53 γ 1* 0.513 sl;pe$^-$ $\alpha_k = 3.5\times10^{-3}$, K/L = 8 0.53* 0.624 $\alpha_k = 2.1\times10^{-3}$ 0.03* 0.87 0.08* 1.045 0.025* 1.55 0.01** 2.41**	D. E. Alburger, Phys. Rev. 85, 734A(1952). *Relative intensities from pe$^-$. **Priv. comm.
$_{46}Pd^{108}_{62}$	$\tau_{\beta\beta}$ $>1.1\times10^{18y}$ cc	R. G. Winter, Phys. Rev. 85, 687(1952).
$_{46}Pd^{110}_{64}$	$\tau_{\beta\beta}$ $>6\times10^{17y}$ cc	R. G. Winter, Phys. Rev. 85, 687(1952).
Ag	σ_s(th n) 5.72	C. T. Hibdon, ANL-4602 (Mar. 1951).

$_{47}Ag^{105}_{58}$	γ's sl;ce$^-$ γ_1 0.0625 K/L > 5 γ_2 0.280 K/L = 8 γ_3 0.343 K/L = 5.8 γ_4 0.440 K/L = 7 Weak: 0.154, 0.181, 0.391 $\gamma_1\gamma_2$, $\gamma\gamma$	R. W. Hayward, Phys. Rev. 85, 760A(1952); priv. comm. Rh(α,2n); Pd(d).
$_{47}Ag^{106}_{59}$	γ's sl,ce$^-$ 0.220 0.717 0.409 0.815 0.511 1.04 K/L = 8 1.235 0.620 1.55 $\gamma\gamma$	R. W. Hayward, Phys. Rev. 85, 760A(1952); priv. comm. Rh(α,n); Pd(d).
$_{47}Ag^{108}_{61}$	β^- 1.49 scin β^-/K ~2 γ ~1* 0.19 scin ~1* 0.42 ~4* 0.61 $\gamma\gamma$, no $\beta\gamma$ Pd K X-rays	M. Goodrich, E. C. Campbell, Phys. Rev. 85, 742A(1952); priv. comm. *Relative intensities.
$_{47}Ag^{110}_{63}$	γ (0.656) sl;ce$^-$ K/L = 14	W. C. Kelly, Phys. Rev. 85, 101(1952).
270^d	γ 1.00* 0.652 s;Cpt 1.03* 0.886 0.26* 1.388 0.22* 1.484 *Relative intensities	B. S. Dzhelepov et al., Doklady Akad. Nauk, S.S.S.R. 77, 597(1951); Guide to Russ. Sci. Lit. 4, 369(1951).
$_{47}Ag^{115}_{68}$	τ 21^m p {(90.8%)2.3^dCd (9.2%)43^dCd	A. C. Wahl, and N. A. Bonner, Phys. Rev. 85, 570(1952).
$_{48}Cd^{109}_{61}$	γ 0.087 sl;ce$^-$ (39^sAg) $\alpha_K\sim6$ K/L = 0.75	O. Huber et al., Helv. Phys. Acta 25, 3 (1952). Ag(p,n).
$_{48}Cd^{115}_{67}$ 43^d	β^- 1.5 a p (<0.02%)4.5^hIn	A. C. Wahl, N. A. Bonner, Phys. Rev. 85, 570(1952).
$_{48}Cd^{115}_{67}$ 2.33^d	τ 2.21 ± 0.04^d β_1 15% 0.5 a β_2 85% 1.1 a γ ~0.55 a $\beta_1\gamma$	A. C. Wahl, N. A. Bonner, Phys. Rev. 85, 570(1952). Cd(n,γ); Cd(γ,n); and fission.
$_{49}In^{111}_{62}$	γ Eγ α_K K/L 0.173 0.104 6.6 0.247 0.054 5.3	O. Huber et al., Helv. Phys. Acta 25, 3 (1952). Cd(p,n).
$_{49}In^{114}_{65}$ 50^d	γ 0.192 sl;ce$^-$ K/L = 0.96	O. Huber et al., Helv. Phys. Acta 25, 3 (1952). Cd(p,n).
	γ (0.192) sl;ce$^-$ K/L = 1.30	W. C. Kelly, Phys. Rev. 85, 101(1952).
$_{50}Sn^{124}_{74}$	$\tau_{\beta\beta}$ $>1.7\times10^{17y}$	M. I. Kalkstein, W. F. Libby, Phys. Rev. 85, 368(1952).
$_{51}Sb^{120}_{69}$	6.0^d Sb^{120} assignment questioned	L. Katz, A. G. W. Cameron, Can J. Phys. 29, 518(1951).

$_{51}Sb^{122}_{71}$ 2.8^{d}	γ 0.58	a	L. Katz, A. G. W. Cameron, Can. J. Phys. 29, 518(1951).
Te	Isotope shift Increase at $Te^{126} - Te^{124}$	S	J. S. Ross, K. Murakawa, Phys. Rev. 85, 559(1952).
$_{52}Te^{120}_{68}$	σ_a(th n) 68	osc	H. Pomerance, T. Arnette, ORNL-940 (1950); priv. comm. (1952).
$_{52}Te^{122}_{70}$	σ_a(th n) 2.7	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{52}Te^{123}_{71}$ 90^{d}	$\gamma\gamma$ delay $<10^{-9s}$		F. K. McGowan, Phys. Rev. 85, 142 (1952).
$_{52}Te^{123}_{71}$	σ_a(th n) 390	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{52}Te^{124}_{72}$	σ_a(th n) 6.5	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{52}Te^{125}_{73}$ 58^{d}	γ 0.110 $\alpha_K = 160$ (0.035) $\alpha_K = 11.4$ M1 K/L = 7.1, L/M = 5.3	sl,scin,pc	J. C. Bowe, P. Axel, Phys. Rev. 85, 858(1952); 85, 734A(1952).
	$\gamma\gamma$ delay $<2 \times 10^{-9s}$		F. K. McGowan, Phys. Rev. 85, 142 (1952).
$_{52}Te^{125}_{73}$ stable	μ −0.7 $\mu(Te^{125})/\mu(Te^{123}) = 1.186$	S	J. S. Ross, K. Murakawa, Phys. Rev. 85, 559(1952).
$_{52}Te^{125}_{73}$	σ_a(th n) 1.5	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{52}Te^{126}_{74}$	σ_a(th n) 0.77	osc	H. Pomerance, T. Arnette, ORNL-940 (1950); priv. comm. (1952).
$_{52}Te^{128}_{76}$	σ_a(th n) 0.3	osc	H. Pomerance, T. Arnette, ORNL-940 (1950); priv. comm. (1952).
$_{52}Te^{130}_{78}$	σ_a(th n) 0.5	osc	H. Pomerance, T. Arnette, ORNL-940 (1950).
$_{53}I^{131}_{78}$	β^- 1* 0.246, 2* 0.328	a$\beta\gamma$	P. E. Cavanagh, Phil. Mag. 43, 221 (1952). *Relative intensities.
	γ 0.638, 0.720	scin	
	$(0.080\gamma)(0.284\gamma)(\theta)$ constant		D. Schiff, Phys. Rev. 85, 727A (1952).
$_{56}Ba^{134}_{78}$	σ_a(th n) 2	osc	H. Pomerance, priv. comm. (1952).
$_{56}Ba^{135}_{79}$	σ_a(th n) 5.6	osc	H. Pomerance, priv. comm. (1952).
$_{56}Ba^{136}_{80}$	σ_a(th n) 0.4	osc	H. Pomerance, priv. comm. (1952).
$_{56}Ba^{137}_{81}$ 2.60^{m}	γ (0.662) K/L = 4.57	sl;ce$^-$	W. C. Kelly, Phys. Rev. 85, 101(1952).
stable	σ_a(th n) 4.9	osc	H. Pomerance, priv. comm. (1952).
$_{56}Ba^{138}_{82}$	σ_a(th n) 0.68	osc	H. Pomerance, priv. comm. (1952).
$_{57}La^{140}_{83}$	β^- ~2.3	scin	R. C. Bannerman et al., Phil. Mag. 42, 1097(1951). *% of γ's.
	γ_1 <1%* 0.093; γ_2 3% 0.335; γ_3 22% 0.49; γ_4 16% 0.82; γ_5 56% 1.62; γ_6 3% 2.55	scin	
	$\gamma_3\gamma_5$, $\gamma_4\gamma_5$, $\gamma_2\gamma_6$		
$_{58}Ce^{136}_{78}$	σ_a(th n) 25	osc	H. Pomerance, priv. comm. (1952).
$_{58}Ce^{138}_{80}$	σ_a(th n) 8.7	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{58}Ce^{140}_{82}$	σ_a(th n) 0.63	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{58}Ce^{142}_{84}$	σ_a(th n) 1.76	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{58}Ce^{144}_{86}$	β^- 97% 0.307, 3% 0.446; γ 0.0547; 0.0794 K/L = 6.3; 0.134 K/L = 8.3; 0.231 K/L = 1.7	s	L. S. Cheng et al., Phys. Rev. 85, 487(1952). Fission; chem.
	γ (0.132) K/L = 5.3	sl;ce$^-$	W. C. Kelley, Phys. Rev. 85, 101(1952);
$_{59}Pr^{140}_{81}$	β^+ 2.23; γ/K x ray <10%; β^+/K ~1.6 assuming K capt/L capt = 7	s$\pi\sqrt{2}$	C. I. Browne et al., Phys. Rev. 85, 146 (1952). Pr(19 Mev d)Nd^{140} $\to Pr^{140}$; ion chem.
$_{59}Pr^{144}_{85}$	β^- 3% 0.605; 12% 1.30; 85% 3.00	s	L. S. Cheng et al., Phys. Rev. 85, 487(1952).
	β^- 2.97	sπ	F. T. Porter, C. S. Cook, Phys. Rev. 85, 733A(1952).
Nd	<0.02 α's/sec(gm of Nd) <0.003 β's/sec(gm of Nd)		G. I. Mulholland, T. P. Kohman, Phys. Rev. 85, 144(1952).
$_{60}Nd^{140}_{80}$	E_{dis} ~ 0.1, K capt/L capt = 2.8 from K x-ray intensities in $Nd^{140} \to Pr^{140} \to Ce^{140}$		C. I. Browne et al., Phys. Rev. 85, 146 (1952). Pr(19 Mev d); ion chem.
$_{60}Nd^{147}_{87}$	γ 0.0918 $K/L_I = 6.4$	sπ	J. W. Mihelich, E. L. Church, Phys. Rev. 85, 690(1952).

$_{60}Nd^{150}_{90}$	τ_β	$>2 \times 10^{15y}$		G. I. Mulholland, T. P. Kohman, Phys. Rev. 85, 144(1952).
$_{61}Pm^{148}_{87}$	τ_2	48^d		J. K. Long, M. L. Pool, Phys. Rev. 85, 137(1952).
	β^-	0.6	a	Nd^{148}(6-Mev p,n);
		1.7		rare earth chem.
	γ	~0.54	a	
$_{61}Pm^{150}_{89}$	τ	2.7^h		J. K. Long, M. L. Pool, Phys. Rev. 85, 137(1952).
	β^-	2.4	a	Nd^{150}(6-Mev p,n).
$_{63}Eu^{152}_{89}$ 9.2^h	γ	0.1219	sπ;ce⁻	H. B. Keller, J. M. Cork, Phys. Rev. 84, 1079(1951).
		K/L ~ 4	(Sm)	
		0.3441		
		K/L ~ 10	(Gd)	
5.3^y	New assignment of γ's			
$_{63}Eu^{154}_{91}$ 5.4^y	New assignment of γ's			H. B. Keller, J. M. Cork, Phys. Rev. 84, 1079(1951).
$_{64}Gd^{150}_{86}$	τ	long		S. G. Thompson et al., Phys. Rev. 85, 758A (1952).
	α	2.7		
$_{64}Gd^{159}_{95}$	18^h produced by Gd(γ)			F. D. S. Butement, Proc. Phys. Soc. (London) A64, 395 (1951).
$_{65}Tb^{160}_{95}$	γ	0.085	scin	F. K. McGowan, Phys. Rev. 85, 151(1952).
		$\alpha_K = 1.6$	E2	
	$(\sim 0.9\beta)(0.085\gamma)$ delay	1.8×10^{-9s}		F. K. McGowan, Phys. Rev. 85, 142(1952).
Dy	7^m α activity formerly assigned to Tb or Gd now assigned to Dy. $E_\alpha = 4.2$.			S. G. Thompson et al., Phys. Rev. 85, 758A (1952).
$_{66}Dy^{165}_{99}$ 2.4^h	γ	0.0951	sπ	J. W. Mihelich, E. L. Church, Phys. Rev. 85, 690(1952).
		$K:L_I:L_{III}$ = 6.4:1.0:<0.2		
	γ	0.095	scin	F. K. McGowan, Phys. Rev. 85, 151(1952).
		$\alpha_K \leq 2.9$		
	$\beta(0.095\gamma)$ delay	$<0.8 \times 10^{-9s}$		F. K. McGowan, Phys. Rev. 85, 142(1952).
$_{67}Ho^{166}_{99}$	τ	$>30^y$		F. D. S. Butement, Proc. Phys. Soc. (London) A65, 254 (1952). Ho(n,γ); chem.
	β_1 46%	0.18	a$\beta\gamma$	$(\beta_1$ or $\beta_2)(\gamma_4$ or $\gamma_5)$, $\beta_3\gamma_2$, $(\gamma_4,\gamma_5)(\gamma_3)$ Er K x ray.
	β_2 46%	0.28	a$\beta\gamma$	
	β_3 8%	1.1	a	
	γ_1	0.095	scin	
	γ_2	0.212		
	γ_3	0.280		
	γ_4	0.725		
	γ_5	0.830		
27.3^h	γ	0.081	scin	F. K. McGowan, Phys. Rev. 85, 151(1952).
		$\alpha_K = 1.9$	E2	
	γ	0.0807	sπ	J. W. Mihelich, E. L. Church, Phys. Rev. 85, 690(1952).
		$K: L_I: L_{II}:L_{III}$ = 0.13:<0.1:<0.72:1		

Er	Isotope shifts (170-168):(168-166):(166-164) = 1:0.9:0.9		S	K. Murakawa, S. Suwa, Phys. Rev. 85, 683(1952).
$_{68}Er^{171}_{103}$	γ 0.1128	K/L ~10	sπ; ce⁻	H. B. Keller, J. M. Cork, Phys. Rev. 84, 1079(1951).
	0.1179	~0.5		
	0.1255	~2		
	0.1764			
	0.2946	~10		
	0.3075	~10		
	0.4197			
$_{69}Tm^{170}_{101}$	β_1	0.876	sl;$\beta\gamma$	R. Richmond, H. Rose, Phil. Mag. 43, 367(1952).
	β_2	0.970	sl	
	β_1	F-K plot linear		
	γ	0.0848	sπ	J. W. Mihelich, E. L. Church, Phys. Rev. 85, 690(1952).
		$K: L_I: L_{II}:L_{III}$ = 0.29:<0.1:0.83:1		
	γ	0.085	scin	F. K. McGowan, Phys. Rev. 85, 151 (1952).
		$\alpha_K = 1.5$	E2	
$_{71}Lu^{176}_{105}$ 3.75^h	β^-	1.1		G. Scharff-Goldhaber et al., Phys. Rev. 85, 734A(1952).
		1.2		
	γ	0.089	scin	
		α = large		
		K/L ~0.1	E2	
	No γ with $0.6<E_\gamma<1$			
	$(1.1\beta)(0.089\gamma)$ delay	$<1^{\mu s}$		
	γ	0.0889	sπ	J. W. Mihelich, E. L. Church, Phys. Rev. 85, 690(1952).
		$K: L_{II}:L_{III}$ = 0.24:0.71:1		
$_{71}Lu^{177}_{106}$	γ	0.112	scin	F. K. McGowan et al., Phys. Rev. 85, 152(1952).
		$\alpha_K = 0.81$	E2	
		$\tau < 5 \times 10^{-10s}$		
		0.206		
		$\alpha_K = 0.04$	E1	
	4.5%	0.318		
	$\gamma\gamma(\theta)$	b = −0.213		
Hf	Relative abundances*			H. E. Duckworth et al., Phys. Rev. 85, 929(1952). *Assuming Hf^{174} = 0.18%.
	170, 171	<0.004%		
	172, 173	<0.005%		
	175	<0.006%		
	σ_t(10.0 ev)	17.0		C. T. Hibdon, ANL-4602 (Mar. 1951).
	(120 ev)	13.1		
	(345 + 2400 ev)	14.4		
	(2700 ev)	14.8		
	(3000 ev)	14.8		
$_{73}Ta^{183}_{110}$	τ	4.83^d		F. D. S. Butement, Proc. Phys. Soc. (London) A64, 395 (1951). W(γ); chem.
W	σ_t(2700 ev)	8.45		C. T. Hibdon, ANL-4602 (Mar. 1951).
	(3000 ev)	8.31		
$_{74}W^{180}_{106}$	σ_a(th n)	30	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{74}W^{182}_{108}$	σ_a(th n)	19.2	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{74}W^{183}_{109}$	σ_a(th n)	10.9	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).

$_{74}W^{184}_{110}$	σ_a(th n)	1.97	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{74}W^{186}_{112}$	σ_a(th n)	34.1	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{75}Re^{185}_{110}$	σ_a(th n)	100	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{75}Re^{187}_{112}$	σ_a(th n)	63	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{77}Ir^{192}_{115}$	τ	74.37^d		J. Kastner, Can. J. Phys. 29, 480(1951).
Pt	Relative abundances* 188, 189 191 193 197 199 200	 <0.002% <0.004% <0.009% <0.010% <0.008% <0.007%		H. E. Duckworth et al., Phys. Rev. 85, 929(1952). *Assuming Pt^{190} = 0.012%.
Au	σ_s(th n)	7.56		C. T. Hibdon, ANL-4602 (Mar. 1951).
$_{79}Au^{197}_{118}$	μ	+0.136	S	F. G. Kelly, Proc. Phys. Soc. (London) A65, 250(1952).
$_{79}Au^{198}_{119}$	γ $\alpha_K = 2.75 \times 10^{-2}$ K/L = 2.2 No ce^- with E <0.328	0.411	sl;ce^-	O. Huber et al., Helv. Phys. Acta 25, 3 (1952).
	$\beta(0.411\gamma)$ delay $<0.4 \times 10^{-9s}$			F. K. McGowan, Phys. Rev. 85, 142(1952).
$_{79}Au^{200}_{121}$	48^m produced by Hg(γ); chem			F. D. S. Butement, Proc. Phys. Soc. (London) A64, 395 (1951).
Hg	σ_s(thermal) σ_t(10.0 ev) (19.5 ev) (2700 ev) (3000 ev)	26.56 13.93 13.3 10.4 10.7		C. T. Hibdon, ANL-4602 (Mar. 1951).
$_{80}Hg^{197}_{117}$ 65^h	τ γ	66.4^h 0.0776 0.1914 K/L ~ 9	sπ;ce^- (Au)	J. M. Cork et al., Phys. Rev. 85, 386 (1952). Hg(pile n).
25^h	γ	0.1343 K/L <0.1 0.1654 K/L ~0.25	sπ;ce^- (Hg) (Hg)	J. M. Cork et al., Phys. Rev. 85, 386 (1952). Hg(pile n).
$_{80}Hg^{203}_{123}$	τ γ	47.9^d 0.2795 K/L ~10	sπ;ce	J. M. Cork et al., Phys. Rev. 85, 386 (1952). Hg(pile n).
	$\beta(0.28\gamma)$ delay $<0.4 \times 10^{-9s}$			F. K. McGowan, Phys. Rev. 85, 142(1952).
$_{81}Tl^{203}_{122}$	σ_a(th n)	11.0	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
$_{81}Tl^{205}_{124}$	σ_a(th n)	0.77	osc	H. Pomerance, ORNL-1164(1951); priv. comm. (1952).
Pb	σ_a(th n)	0.162	osc	D. J. Littler, E. E. Lockett, priv. comm. (1952).
$_{82}Pb^{206}_{124}$	σ_a(th n)	0.026	osc	D. J. Littler, E. E. Lockett, priv. comm. (1952).
$_{82}Pb^{207}_{125}$	σ_a(th n)	0.69	osc	D. J. Littler, E. E. Lockett, priv. comm. (1952).
$_{82}Pb^{210}_{128}$	β^- γ $(0.0467\gamma)\beta^-$ $\gamma\gamma$ for E_γ = 16 – 30 kev	0.018 0.0467	scin	R. C. Bannerman, S. C. Curran, Phys. Rev. 85, 134(1952).
	β^- E_{dis}	0.018 0.065	pc	G. M. Insch et al., Phys. Rev. 85, 805 (1952).
$_{82}Pb^{212}_{130}$	$H\rho$(F) $H\rho$(I)	1388.5 ± 0.3 1753.9 ± 0.4	sl	H. Craig, Phys. Rev. 85, 688(1952).
$_{83}Bi^{203}_{120}$	α α/K	~4.85 $\sim 10^{-7}$	pc	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 85, 757A(1952). Pb(60 Mev p); chem.
$_{83}Bi^{210}_{127}$ long	α	4.93		H. B. Levy, I. Perlman, Phys. Rev. 85, 758A (1952). Bi(n,γ); ms.
$_{83}Bi^{212}_{129}$	$H\rho$(A)	533.66 ± 0.12	sl	H. Craig, Phys. Rev. 85, 688(1952).
$_{84}Po^{210}_{126}$	$\alpha\gamma(\theta)$ indicates E2 γ $\alpha\gamma$ delay $<10^{-9s}$		scin	S. DeBenedetti, G. H. Minton, Phys. Rev. 85, 944(1952); 85, 726A(1952).
$_{88}Ra^{228}_{140}$	σ(th n,$\gamma\beta$)66^mAc	~ 36		F. Depocas, B. G. Harvey, Phys. Rev. 85, 499(1952).
$_{88}Ra^{230}_{142}$	τ β^-	1^h 1.2	sπ	W. A. Jenkins, G. T. Seaborg, Phys. Rev. 85, 758A(1952). Th(180 Mev d); chem.
$_{89}Ac^{228}_{139}$	β^-	~1 1.6 1.8 2.16	sπ	C. G. Campbell et al., Phil. Mag. 42, 126(1952).
$_{89}Ac^{229}_{140}$	τ	66 ± 5^m		F. Depocas, B. G Harvey, Phys. Rev. 85, 499 (1952). Ra^{228}(n,$\gamma\beta$); chem.
	τ	67^m		W. A. Jenkins, G. T. Seaborg, Phys. Rev. 85, 758A (1952). Ra^{226}(α,p).

$_{89}Ac^{230}_{141}$	τ	$<1^{m}$		W. A. Jenkins, G. T. Seaborg, Phys. Rev. 85, 758A (1952). d Ra^{230}.
	β^-	2.2	sπ	
$_{92}U^{234}_{142}$	γ	$\geq 35\%$ 0.055	ppl	J. Teillac, Compt. rend. 230, 1056 (1950).
$_{92}U^{238}_{146}$	γ	$\geq 24\%$ ~0.050	ppl	G. Albouy, J. Teillac, Compt. rend. 234, 829(1952).
	γ	$\geq 23\%$ 0.048	ppl	B. Zajac, Phil. Mag. 42, 264(1952).
	σ(th n,f)	$<5 \times 10^{-4}$		R. L. Macklin, J. H. Lykins, J. Chem. Phys. 19, 844(1951).
$_{92}U^{239}_{147}$	β^-	1.22	sl	J. R. Huizenga et al., Phys. Rev. 84, 1264 (1951). U^{238} (pile n); chem.
	γ	0.075	scin	
	2.0β and 0.9 γ not found			
$_{93}Np^{235}_{142}$	τ	410^{d}	pc	R. A. James et al., Phys. Rev. 85, 369 (1952). U^{235}(20 Mev d,2n).
	K $<10\%$			
	L $>90\%$			
$_{93}Np^{239}_{146}$	No E_β	>0.72	sl	J. R. Huizenga et al., Phys Rev. 84, 1264 (1951).
$_{95}Am^{241}_{146}$	τ	475^{y}		B. B. Cunningham, quoted by L. B. Asprey et al., J. Am. Chem. Soc. 73, 5715(1951).
		470^{y}		B. G. Harvey, Phys. Rev. 85, 482(1952).
	σ(pile n,γ)400^{y} Am^{242}	~50		K. Street, Jr.,et al., Phys. Rev. 85, 135 (1952).
$_{95}Am^{242}_{147}$ ~16^{h}	σ(pile n,f)	~2000		K. Street, Jr.,et al., Phys. Rev. 85, 135 (1952).
~400^{y}	σ(pile n,γ)Am^{243}	~2000		K. Street, Jr.,et al., Phys. Rev. 85, 135 (1952).
	σ(pile n,f)	~6000		
$_{95}Am^{243}_{148}$	σ(pile n,f)	<40		K. Street, Jr.,et al., Phys. Rev. 85, 135 (1952).

Q's Between Ground States

$D(\gamma,n)H^1$	-2.231 ± 0.003	J. C. Noyes et al., Phys. Rev. 85, 727A(1952).
$H^2(d,n)He^3$	$+3.24 \pm 0.04$	H. Bichsel et al., Helv. Phys. Acta 25, 119 (1952).
$B^{10}(n,\alpha)Li^7$	$+2.78 \pm 0.02$	
$Li^6(t,d)Li^7$	$+0.982 \pm 0.007$	T. P. Pepper et al., Phys. Rev. 85, 155(1952).
$Li^6(t,p)Li^8$	$+0.784 \pm 0.015$	
$Be^9(\gamma,n)Be^8$	-1.664 ± 0.002	J. C. Noyes et al., Phys. Rev. 85, 727A(1952).
$N^{14}(n,\alpha)B^{11}$	-0.24	W. Bollmann, W. Zünti, Helv. Phys. Acta 24, 517(1951).
$C^{12}(\gamma,n)C^{11}$	-18.7	L. Katz, A. G. W. Cameron, Can. J. Phys. 29, 518(1951) and L. Katz et al., Can. J. Research 28A, 113(1950).
$O^{16}(d,\alpha)N^{14}$	$+3.09 \pm 0.02$	H. B. Burrows et al., Proc. Roy. Soc. (London) 209A, 478(1951).
$O^{16}(d,p)O^{17}$	$+1.93 \pm 0.01$	
$F^{19}(d,\alpha)O^{17}$	$+10.04 \pm 0.02$	
$O^{16}(d,n)F^{17}$	-1.51	F. A. El-Bedewi et al., Proc. Phys. Soc. (London) A64, 757 (1951).
$F^{19}(d,p)F^{20}$	$+4.39 \pm$	H. B. Burrows et al., Phys. Rev. 85, 155(1951).
$F^{19}(p,n)Ne^{19}$	-4.040 ± 0.004	H. B. Willard et al., Phys. Rev. 85, 849(1952).
$F^{19}(p,n)Ne^{19}$	-4.1	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
$Na^{23}(p,\alpha)Ne^{20}$	$+2.372 \pm 0.008$	D. M. Van Patter et al., Phys. Rev. 85, 142(1952); MIT Progress Report, Nov. 1951, 44.
$Ne^{20}(d,p)Ne^{21}$	$+4.529 \pm 0.007$	
$Ne^{22}(d,p)Ne^{23}$	$+2.964 \pm 0.007$	
$Mg^{25}(d,\alpha)Na^{23}$	$+7.019 \pm 0.013$	
$Na^{23}(p,n)Mg^{23}$	-4.97	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
$Al^{27}(p,\alpha)Mg^{24}$	$+1.595 \pm 0.007$	D. M. Van Patter et al., Phys. Rev. 85, 142(1952); MIT Progress Report, Nov. 1951, 44.
$Mg^{24}(d,p)Mg^{25}$	$+5.097 \pm 0.007$	
$Mg^{24}(d,p)Mg^{25}$	$+4.99 \pm 0.10$	J. Ambrosen, Nature 169, 408(1952).
$Mg^{25}(d,p)Mg^{26}$	$+8.86 \pm 0.10$	
$Mg^{25}(d,p)Mg^{26}$	$+8.880 \pm 0.012$	D. M. Van Patter et al., Phys. Rev. 85, 142(1952); MIT Progress Report, Nov. 1951, 44.
$Mg^{26}(d,p)Mg^{27}$	$+4.207 \pm 0.006$	
$Mg^{26}(d,p)Mg^{27}$	$+4.16 \pm 0.10$	J. Ambrosen, Nature 169, 408(1952).
$Mg^{24}(p,n)Al^{24}$	-14.8 ± 0.3	A. C. Birge, Phys. Rev. 85, 753A(1952).
$Mg^{25,26}(p,n)Al$	-5.1	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
$Si^{29}(d,\alpha)Al^{27}$	$+5.994 \pm 0.011$	D. M. Van Patter et al., Phys. Rev. 85, 142(1952); MIT Progress Report, Nov. 1951, 44.
$Al^{27}(p,n)Si^{27}$	-5.9	J. P. Blaser et al., Helv. Phys. Acta 24, 465(1951).
$P^{31}(p,\alpha)Si^{28}$	$+1.909 \pm 0.010$	D. M. Van Patter et al., Phys. Rev. 85, 142 (1952); MIT Progress Report, Nov. 1951, 44.
$P^{31}(d,\alpha)Si^{29}$	$+8.158 \pm 0.011$	
$Si^{29}(d,p)Si^{30}$	$+8.388 \pm 0.013$	
$Si^{30}(d,p)Si^{31}$	$+4.364 \pm 0.007$	
$Si^{28}(d,n)P^{29}$	$+0.29 \pm 0.04$	C. E. Mandeville et al., Phys. Rev. 85, 193(1952); 85, 725A(1952).
$Si^{29}(d,n)P^{30}$	$+3.27 \pm 0.04$	
$Si^{30}(d,n)P^{31}$	$+4.92 \pm 0.04$	
$P^{31}(d,p)P^{32}$	$+5.704 \pm 0.008$	D. M. Van Patter et al., Phys. Rev. 85, 142(1952); MIT Progress Report, Nov. 1951, 44.

$P^{32}(d,n)S^{32}$	+6.81 ± 0.08	F. A. El-Bedewi et al., Nature 169, 235(1952).
$Cl^{37}(p,n)A^{37}$	−1.598 ± 0.002	W. A. Schoenfeld et al., Phys. Rev. 85, 873(1952).
$Cr^{53}(p,n)Mn^{53}$	−1.380 ± 0.008	J. A. Lovington et al., Phys. Rev. 85, 585(1952).
$Cr^{54}(p,n)Mn^{54}$	−2.163 ± 0.005	
$Mn^{55}(p,n)Fe^{55}$	−1.01	P. H. Stelson, W. M. Preston, Phys. Rev. 83, 469(1951).
$Ni^{62}(p,n)Cu^{62}$	−4.6	J. P. Blaser et al., Helv. Phys. Acta 24, 441(1951).
$Ni^{64}(p,n)Cu^{64}$	−2.5	
$Se^{78}(p,n)Br^{78}$	−4.4	
$Se^{80}(p,n)Br^{80}$	−2.6	
$Sr^{87}(p,n)Y^{87}$	−2.5	
$Y^{89}(p,n)Zr^{89}$	−3.5	
$Zr^{92}(p,n)Nb^{92}$	−2.5	
$Zr^{96}(p,n)Nb^{96}$	−2.6	
$Nb^{93}(p,n)Mo^{93}$	−3.7	
$Mo^{94}(p,n)Tc^{94}$	−5.0	
$Mo^{95}(p,n)Tc^{95}$	−3.6	
$Mo^{96}(p,n)Tc^{96}$	−3.8	
$Ru^{100}(p,n)Rh^{100}$	−4.1	
$Ru^{101}(p,n)Rh^{101}$	−2.6	J. P. Blaser et al., Helv. Phys. Acta 24, 441(1951).
$Te^{128}(p,n)I^{128}$	−3.2	
$Te^{130}(p,n)I^{130}$	−3.3	

Packing Fraction Differences, Δf, in Units 10^{-4} amu.

Doublet	Δf	Reference
$K^{39} - C_2HN$	−12.20 ± 0.02	A. Henglein, Z. Naturforsch. 6a, 745(1951).
$K^{41} - C_2H_3N$	−15.88 ± 0.01	

Atom	Mass	Reference
Na^{23}	22.99665 ±0.00008	A. Henglein, Z. Naturforsch. 6a, 745(1951). Double doublet
Pb^{208}	208.0416 ±0.0015	P. I. Richards et al., Phys. Rev. 85, 630(1952). Time of flight.
Bi^{209}	209.0466 ±0.0015	

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